CLAIMS:

1. A method of optical spectroscopy comprising:
   - directing a light pulse having a first pulse duration to a detection volume,
   - receiving a return radiation signal, the return radiation signal having a first signal component having a second pulse duration, the second pulse duration being substantially similar to the first pulse duration, and one or more second signal components,
   - reducing of the second signal component in the return radiation signal,
   - performing of a spectroscopic analysis of the return radiation signal.

2. The method of claim 1, the first pulse duration being below 10 picoseconds, preferably between 0.5 picoseconds and 3 picoseconds.

3. The method of claim 1 or 2, the light pulse being provided by a pulsed laser source.

4. The method of claim 1, 2, or 3, the elimination of the second signal component being performed by delaying part of the return radiation signal.

5. The method of any one of the preceding claims 1 to 4, the reduction of the second signal component being performed by the steps of:
   - adding the undelayed return radiation signal and the delayed return radiation signal to provide a first signal,
   - providing a second signal by adding the undelayed return radiation signal and the delayed return radiation signal, and inverting the resulting signal after arrival of the first signal component,
   - adding the first and second signals.

6. The method of any one of the preceding claims 1 to 5, the reduction of the second signal component being performed by time gating using the timing of the light pulse as a reference.

7. The method of any one of the preceding claims 1 to 6, the reduction of the second signal component being performed by directing a sequence of the light pulses to the detection volume with a first frequency, and using a frequency selective amplifier for reduction of the second signal component.

8. The method of any one of preceding claims 1 to 7, the second signal component being a luminescence, in particular fluorescence, signal component and/or background radiation.

9. Apparatus for optical spectroscopy comprising:

- means (102; exs) for directing of a light pulse having a first pulse duration to a detection volume (108), the light pulse causing a return radiation signal having a first signal component and one or more second signal components, the first signal component having a second pulse duration being substantially similar to the first pulse duration,
- means (114; gp, ph, phc, spct) for reducing of the second signal component of the return radiation signal,
- means (104; spct) for performing of a spectroscopic analysis of the return radiation signal.

10. The apparatus of claim 9, the pulse duration being below 10 pico seconds, preferably between 0.5 pico seconds and 3 pico seconds.

11. The apparatus of claim 9 or 10, further comprising a pulsed laser source for providing a sequence of the light pulses, the pulsed laser light source being optically coupled (gp, ph) to the means for reducing of the fluorescence component to provide a time reference.

12. The apparatus of claim 9, 10 or 11, further comprising photon counting means (phc) for detecting the light pulse in order to provide a time reference for the means for reducing and for receiving of the return radiation to provide the return radiation signal.

13. The apparatus of any one of the preceding claims 9 to 13, comprising optical means (308, 310) for delaying part of the return radiation in order to provide a delayed return radiation signal (118) for elimination of the second signal component.

14. The apparatus of any one of the preceding claims 9 to 13, further comprising electronic means for delaying part of the return radiation signal for eliminating of the second signal component.

15. The apparatus of any one of the preceding claims 9 to 14, the means for performing of a spectroscopic analysis being adapted to perform Raman spectroscopic analysis.

16. The apparatus of any one of the preceding claims 9 to 15, further comprising means (124) for multiplication of the undelayed return radiation signal (116) by a scaling factor.